IN THE CLAIMS:

The text of all pending claims is set forth below. Please **AMEND** claims 1-14 in accordance with the following:

1. (CURRENTLY AMENDED) A circular rotor for a synchronous motor, comprising:

a plurality of poles, where at least a part of an outer periphery of one pole of the rotor has a shape of a hyperbolic cosine curve~~,~~ in a cross section perpendicular to a central axis of the rotor~~, is defined by a curve of a hyperbolic function~~.

2. (CURRENTLY AMENDED) A circular rotor for a synchronous motor according to claim 1, wherein more than half of the outer periphery of the one pole of the rotor is defined by the hyperbolic ~~function~~ cosine curve.

3. (CURRENTLY AMENDED) A circular rotor for a synchronous motor according to claim 1, wherein all of the outer periphery of the one pole of the rotor is defined by the hyperbolic ~~function~~ cosine curve.

4. (CURRENTLY AMENDED) A circular rotor for a synchronous motor according to claim 1, wherein a central part of the outer periphery of the one pole is defined the hyperbolic ~~function~~ cosine curve.

5. (CURRENTLY AMENDED) A circular rotor for a synchronous motor, comprising:

a plurality of poles, where at least a part of an outer periphery of one pole of the rotor, in a cross section perpendicular to a central axis of the rotor, is defined by a curve of a hyperbolic function ~~A circular rotor for a synchronous motor according to claim 1~~, wherein the hyperbolic

function is expressed as $R = A\text{-}B * (e^{c\theta} + e^{-c\theta})$, where R represents a distance from a central axis of the rotor or a fixed point, θ represents a rotational angle from a straight line passing through a center of the outer periphery of one pole and perpendicular to the central axis of the rotor, A, B and C are constants and e is a base of natural logarithm or a constant.

6. (CURRENTLY AMENDED) A circular rotor for a synchronous motor, comprising:

a plurality of poles, where at least a part of an outer periphery of one pole of the rotor, in a cross section perpendicular to a central axis of the rotor, is defined by a curve of a hyperbolic function ~~A circular rotor for a synchronous motor according to claim 1~~, wherein the hyperbolic function is expressed as $X = A\text{-}B * (e^{cY} + e^{-cY})$ on a X-Y coordinate system with a X axis passing through a center of the outer periphery of one pole of the rotor and perpendicular to a central axis of the rotor, a Y axis perpendicular to the X axis and the central axis of the rotor and an origin as a crossing point of the X axis and the Y axis, where A, B and C are constants and e is a base of natural logarithm or a constant.

7. (CURRENTLY AMENDED) A rotor for a synchronous motor according to ~~claims~~ claim 1 ~~through 6~~, wherein the outer periphery of one pole of the rotor includes a region defined based on the hyperbolic ~~function~~ cosine curve and a second region defined based on segments of straight lines or curves.

8. (CURRENTLY AMENDED) A synchronous motor, comprising:

a circular rotor with a plurality of magnetic poles perpendicular to a central axis of the rotor, wherein at least one magnetic pole of the plurality of magnetic poles has an outer edge having ~~that is defined by a~~ shape of a hyperbolic cosine curve ~~of a hyperbolic function~~.

9. (CURRENTLY AMENDED) A synchronous motor according to claim 8, wherein more than half of the outer periphery of the one pole of the rotor is defined by the hyperbolic cosine curve ~~function~~.

10. (CURRENTLY AMENDED) A synchronous motor according to claim 8, wherein all of the outer periphery of the one pole of the rotor is defined by the hyperbolic cosine curve ~~function~~.

11. (CURRENTLY AMENDED) A synchronous motor according to claim 8, wherein a central part of the outer periphery of the one pole is defined the hyperbolic ~~function~~ cosine curve.

12. (CURRENTLY AMENDED) A synchronous motor, comprising:

a circular rotor with a plurality of magnetic poles perpendicular to a central axis of the rotor, wherein at least one magnetic pole of the plurality of magnetic poles has an outer edge that is defined by a curve of a hyperbolic function ~~A synchronous motor according to claim 8~~, wherein the hyperbolic function is expressed as $R = A\text{-}B * (e^{c\theta} + e^{-c\theta})$, where R represents a distance from a central axis of the rotor or a fixed point, θ represents a rotational angle from a straight line passing through a center of the outer periphery of one pole and perpendicular to the central axis of the rotor, A, B and C are constants and e is a base of natural logarithm or a constant.

13. (CURRENTLY AMENDED) A synchronous motor, comprising:

a circular rotor with a plurality of magnetic poles perpendicular to a central axis of the rotor, wherein at least one magnetic pole of the plurality of magnetic poles has an outer edge

that is defined by a curve of a hyperbolic function ~~A synchronous motor according to claim 8,~~ wherein the hyperbolic ~~function~~ curve is expressed as $X = A\text{-}B * (e^{cY} + e^{-cY})$ on a X-Y coordinate system with a X axis passing through a center of the outer periphery of one pole of the rotor and perpendicular to a central axis of the rotor, a Y axis perpendicular to the X axis and the central axis of the rotor and an origin as a crossing point of the X axis and the Y axis, where A, B and C are constants and e is a base of natural logarithm or a constant.

14. (CURRENTLY AMENDED) A synchronous motor according to claim 8, wherein the outer periphery of one pole of the rotor includes a region defined based on the hyperbolic ~~function~~ cosine curve and a second region is defined based on segments of straight lines or curves.